External Coloanal Anastomosis Without Covering Stoma in Low-Lying Rectal Cancer

Ashraf Abdel-Azeem Mohamed · Abdel-Fatah Saleh Abdel-Fatah ·
Khaled Mohamed Mahran · Abo-Bakr Mohamed Mohie-ElDin

Received: 27 June 2010 / Accepted: 31 October 2010 / Published online: 16 November 2010
© Association of Surgeons of India 2010

Abstract The aim of this study was to evaluate the safety and functional outcome of external coloanal anastomosis without covering stoma in treating low-lying rectal cancer. All patients undergoing the coloanal anastomosis for low lying rectal cancer in the Department of General Surgery, Minia University Hospital, between May 2006 and May 2009 were included. Seventy two patients underwent coloanal anastomosis, and follow up was available for all patients. Mean follow up period was 12.6 ± 4.7 months. Postoperatively, fecal continence was normal in 84.7% of patients. Postoperative complications included anastomotic fistula in 3 patients (4.2%) and anastomotic stenosis in 6 patients (8.3%). There was no effect of pre or postoperative adjuvant therapy on the procedure outcome. There was no local recurrence during follow up period. Three patients died at the end of follow up period due to distant metastasis. In treatment of low-lying rectal cancer, abdominoperineal resection should be avoided if coloanal anastomosis provides similar control of the disease as it is safe and has good functional results and acceptable complication rate.

Keywords Rectal · Coloanal · Cancer · Abdominoperineal

Introduction

The first operation to allow patients with rectal cancer to avoid permanent stoma was anterior resection which was performed by Dixon in the 1940 s in patients with tumors

of the upper third of the rectum. Coloanal anastomosis (CAA) was proposed for patients with low rectal cancers allowing sphincter preservation with normal anal continence when compared to abdominoperineal resection (APR) [1, 2]. Sphincter preserving surgical techniques were proposed in lower third rectal cancer depending on the belief that a distal safety margin of 1 cm is sufficient, [3] provided that the tumor is moderately or well differentiated with no infiltration of the puborectal muscle. [4] The final decision to perform CAA or APR was always taken intraoperatively as assessment of distance separating the tumor from the sphincter preoperatively is sometimes impossible. [5] Partial excision of the upper part of the internal sphincter may be needed to achieve tumor free resection margin making CAA more applicable. [6–8]

The present study included patients who had resection of low rectal cancer and CAA using the technique of rectal stump eversion, pull-through and immediate introduction of this anastomosis into the pelvis. This technique was originally described by Maunsell [9] in 1892 and modified by Weir [10] in 1901. The main outcome measure was the functional results of this sphincter preserving technique.

Study Definitions [11]

- High anterior resection refers to colorectal anastomosis at the level between the sacral promontory and the anterior peritoneal reflection about 8 to 16 cm from the anal verge.
- Low anterior resection refers to a colorectal anastomosis at the level distal to the anterior peritoneal reflection and proximal to the anorectal junction about 5 to 8 cm above the anal verge.

A. A.-A. Mohamed (✉) · A.-F. S. Abdel-Fatah · K. M. Mahran ·
A.-B. M. Mohie-ElDin
University Hospital,
Minia City, Egypt
e-mail: ashraf.azeem@yahoo.com

- Ultralow or extended anterior resection refers to colorectal or more usually CAA at the level of the anorectal junction.

Material and Methods

A total of 72 patients with low-lying rectal lesions (mid and lower thirds) were seen in the Department of Surgery at Minia University Hospital between May 2006 and May 2009 and underwent resection and CAA using the technique of rectal stump eversion, pull-through, and immediate introduction of this anastomosis into the pelvis.

The following variables were analyzed: diagnosis including stage and distance of the lesion to the dentate line, adjuvant therapy, distance of the anastomosis to the dentate line, use of protective colostomy and follow up including local recurrence, sphincteric function, mortality and associated morbidity (i.e. abscess, fistula, stricture).

Sphincteric function was graded according to the following classification: [12]

- Normal continence was defined as no changes in continence after surgery provided normal previous function
- Mild incontinence indicated minor sporadic incontinence episodes not interfering with normal activity
- Moderate incontinence indicated frequent incontinence episodes interfering with normal activity
- Complete incontinence indicated loss of control of sphincteric function.

Technique

Informed consent was obtained from all patients before surgery including the possibility of doing abdominoperineal resection with permanent stoma, the expected complications and the use of the data in research work. A standardized surgical procedure for rectal cancer was performed in all patients including high ligation of inferior mesenteric artery, node dissection and total mesorectal excision which consists of sharp dissection of avascular plane between parietal and visceral pelvic fascia with inclusion of Denonvilliers' fascia and the peritoneal reflection. Dissection distal to the peritoneal reflection was continued to the level of the pelvic floor. The resection margins are marked with stay sutures followed by resection of the affected segment between clamps. The rectal stump is irrigated with antiseptic solution. The stay sutures in the distal stump are pulled through the anus until the stump is completely everted. The stay sutures in the proximal stump are pulled through the distal stump until coming out from the anus. Following this step, additional resection can then be

achieved until being sure that the margins is free in frozen sections, then CAA was performed by a transanal hand sewing method, quadrant by quadrant, using one layer of interrupted absorbable sutures. After completing the anastomosis, the rectum is placed back into the pelvis followed by suturing the peritoneum of the mesentery to the pelvic wall to seal the pelvis off from the peritoneal cavity. In tumor located very low in the rectum, the mass can be resected after eversion.

Results

A total of 72 patients with low-lying rectal lesions underwent resection and CAA between May 2006 and May 2009 in the Department of Surgery at Minia University Hospital. Patient details are shown in Table 1.

The frequency of defecation at the end of the follow up period was as follow: 1 per day in 12 patients (16.7%), 1 to 3 per day in 36 patients (50%), 4 to 5 per day in 18 patients (25%), and more than 5 episodes per day in 6 patients (8.3%).

Nine patients received preoperative and 21 patients received postoperative adjuvant treatment. Fifteen patients with cancer stages III and 3 patients with cancer stage IV received preoperative chemotherapy and radiotherapy. Twelve other patients received postoperative adjuvant therapy as follows: 3 patients stages II, 6 patients stage III, and 3 patients stage IV. There was no increase in the

Table 1 Patient details

	Patients (No, %)
Age (yr; mean±SD)	58.7±12.3
Sex (M/F)	18/6
Tumour stage:	
- Stage I	24 (33.3)
- Stage II	9 (12.5)
- Stage III	27 (37.5)
- Stage IV	12 (16.7)
Distance of lesion to dentate line (cm):	
- 2–4	24 (33.3)
- 4–6	30 (41.7)
- 6–8	9 (12.5)
- 8–10	3 (4.2)
- 12–14	3 (4.2)
- 14–16	3 (4.2)
Adjuvant treatment	
- Preoperative	9 (12.5)
- Postoperative	21 (29.2)
Hospital stay (days; mean±SD)	10.4±2.7
Follow up period (months; mean±SD)	12.6±4.7

incidence of incontinence or anastomotic stenosis in patients receiving pre or postoperative adjuvant therapy compared with the whole group of patients. Postoperative complications are shown in Table 2.

Normal continence was found in 84.7% of patients at the end of the follow up period. Postoperative complications occurred in 9 patients (12.5%). Three patients (4.2%) developed anastomotic fistula presented by pelvic abscess with fever and diarrhea 10 days postoperatively, diagnosed by CT and drained through anastomosis with complete resolution within 2 weeks. Six patients (8.3%) developed anastomotic stenosis treated by dilatation under local anesthesia. The distal margin was greater than 1 cm in all patients. The degree of continence postoperatively was not related to the distance between the anastomosis and the dentate line (Table 3). Complete incontinence occurred in one patient (1.4%) who had low rectal pressure preoperatively. At the end of the follow up period, 3 patients died due to distant metastasis but without local recurrence.

Discussion

Giving chance for local control and cure by complete resection is the primary goal of operations for rectal cancer. [13] Currently, sphincter preserving operations have become usual for low-lying rectal cancer with advances in rectal anastomosis techniques. [5] CAA has been proposed in cases of low rectal carcinoma to avoid abdominal colostomy [5] and improve patient quality of life [14]. The technique used in this study was used in other studies and reported to be safe in treatment of low-lying rectal lesions [12, 15]. Oncologic safety of CAA for distal rectal cancer have been reported in many studies [14, 16, 17] leading to increased rate of performing this procedure and as well, increased rate of complications [18].

The frequency of defecation was 4 times or more per day in 33.3% of patients which is attributed to reduction in the reservoir capacity of the rectum [19] which is increased with time due to progressive distention of the distal colon.

Table 2 Postoperative complications

	Patients (No, %)
Sphincteric function:	
- Mild incontinence	8 (11.1)
- Moderate incontinence	2 (2.8)
- Complete incontinence	1 (1.4)
Anastomotic fistula	3 (4.2)
Anastomotic stenosis	6 (8.3)
Mortality	3 (4.2)

Table 3 Distance between anastomosis and dentate line

Distance (cm)	Patients (No, %)
0	24 (33.3)
1–2	30 (41.7)
2–4	12 (16.7)
4–6	6 (8.3)

This coincides with other studies reporting an incidence of frequent defecation in about 30% of patients [20, 21]. Nerve injury may occur during eversion of the distal stump leading to postoperative fecal incontinence [12]. Normal continence was present in 84.7% of study patients, this incidence compares favorably with other studies [18, 22]. Decision to perform sphincter preserving low resection is not affected by cancer stage, provided that adequate distal margin of resection could be obtained [23].

No local recurrence occurred during the follow up period, this compares favorably with 6.8% local recurrence by Baik et al. [18], 20% by Hautefeuille et al., [24] 6% by Parc et al., [25] 5% by Cavaliere et al. [26] and Huguet et al. [27] As regard local recurrence in APR for low-lying rectal cancer, Nakagoe et al. [28] reported 7% local recurrence. It was reported that there was no significant difference in incidence of local recurrence between sphincter preserving operations and APR. [29] Consequently, the recurrence rate and mortality of CAA for low-lying rectal cancer are not greater than those of APR because total mesorectal excision was performed in both techniques. [18]

Hassan et al. [14] found that pre or postoperative pelvic radiotherapy had a negative impact on complications and colostomy free survival, while in our study, adjuvant therapy was given as needed with no drawbacks.

In this study 39 patients (54.2%) had stage III or IV disease, 3 of them died at the end of the follow up period from cancer metastasis. Mean hospital stay was 10.4 ± 2.7 days. This hospitalization compares favorably with that in studies using covering stoma where hospital stay was 24.5 days in study by Berger et al., [30] and 19.6 days in study by Parks and Percy [15].

A covering stoma was not used in this study although it was used by others [31, 32]. Anastomotic leak was detected in only 3 cases (4.2%), *despite no use of covering stoma*, where it is presented with local signs (pelvic abscess) and without symptoms of peritonitis. This compares favorably with Cavaliere et al. [33] who report anastomotic leak rate of 18% and Cutait et al. [34] who reported anastomotic leak rate of 31.9% even with the use of covering stoma. *Consequently, the use of covering stoma does not decrease the rate of anastomotic leak.*

Stenosis of the anastomosis was seen in 6 patients (8.3%), this compares favorably with stenosis rate of 6.3%

by Luna-Pérez et al., [35] 21% by Cavaliere et al. [33] and 42.1% by Bernard et al. [36] This may be related to the level of anastomosis as it was reported that the stenosis incidence was 25% when constructing a transanal anastomosis [22] and 8.7% for ileoanal anastomosis. [37]

Conclusion

Patients with low-lying rectal cancer who require surgery must be carefully evaluated to avoid an APR if similar control of the disease can be achieved with less invasive procedures. CAA with rectal stump eversion has good functional results and acceptable complication rate with no need for routine use of covering stoma.

References

1. Bittorf B, Stadelmaier U, Göhl J, Hohenberger W, Matzel KE (2004) Functional outcome after intersphincteric resection of the rectum with coloanal anastomosis in low rectal cancer. *EJSO* 30:260–265
2. McNamara DA, Parc R (2003) Methods and results of sphincter-preserving surgery for rectal cancer. *Cancer Control* 10:212–218
3. Kohler A, Athanasiadis S, Ommer A, Psarakis E (2000) Long-term results of low anterior resection with intersphincteric anastomosis in carcinoma of the lower one-third of the rectum: analysis of 31 patients. *Dis Colon Rectum* 43:843–850
4. Bruch HP, Kolbert G (1997) Results of deep rectum resection and intersphincteric rectum excision. *Chirurg* 68:689–692
5. Pocard M, Sideris L, Zenasni F, Duvillard P, Boige V, Goéré D et al (2007) Functional results and quality of life for patients with very low rectal cancer undergoing coloanal anastomosis or perineal colostomy with colonic muscular graft. *EJSO* 33:459–462
6. Takase Y, Oya M, Komatsu J (2002) Clinical and functional comparison between stapled colonic J-pouch low rectal anastomosis and hand-sewn colonic J-pouch anal anastomosis for very low rectal cancer. *Surg Today* 32:315–321
7. Willis S, Kasperk R, Braun J, Schumpelick V (2001) Comparison of colonic J-pouch reconstruction and straightcoloanal anastomosis after intersphincteric rectal resection. *Langenbeck's Arch Surg* 386:193–199
8. Rullier E, Zerbib F, Laurent C, Bonnel C, Caudry M, Saric J, Parneix M (1999) Intersphincteric resection with excision of internal anal sphincter for conservative treatment of very low rectal cancer. *Dis Colon Rectum* 42:1168–1175
9. Corman ML (1981) A new method of excising the two upper portions of the rectum and the lower segment of the sigmoid flexure of the colon—by H. Widenham Maunsell. *Dis Colon Rectum* 24:649–654
10. Weir RF (1901) An improved method of treating high-seated cancers of the rectum. *JAMA* 37:801–803
11. Ho Y-H (2006) Techniques for restoring bowel continuity and function after rectal cancer surgery. *World J Gastroenterol* 12:6252–6260
12. Velez JP, Villavicencio RT, Schraut W, Lee K (1999) Outcome analysis of external coloanal anastomosis. *Am J Surg* 177:467–471
13. Paty PB, Enker WE, Cohen AM, Lauwers GY (1994) Treatment of rectal cancer by low anterior resection with coloanal anastomosis. *Ann Surg* 219:365–373
14. Hassan I, Larson DW, Wolff BG, Cima RR, Chua HK, Hahnloser D et al (2008) Impact of pelvic radiotherapy on morbidity and durability of sphincter preservation after coloanal anastomosis for rectal cancers. *Dis Colon Rectum* 51:32–37
15. Parks AG, Percy JP (1982) Resection and sutured coloanal anastomosis for rectal carcinoma. *Br J Surg* 69:301–304
16. Kim NK, Lim DJ, Yun SH, Shon SK, Min JS (2001) Ultralow anterior resection and coloanal anastomosis for distal rectal cancer: functional and oncological results. *Int J Colorectal Dis* 16:234–237
17. Enker WE, Jr Stearns MW, Janov AJ (1985) Peranal coloanal anastomosis following low anterior resection for rectal carcinoma. *Dis Colon Rectum* 28:576–581
18. Baik SH, Kim NK, Lee KY, Sohn SK, Cho CH (2005) Hand-sewn coloanal anastomosis for distal rectal cancer: long-term clinical outcomes. *J Gastrointest Surg* 9:775–780
19. Williams NS, Price R, Johnston D (1980) The long term effect of sphincter preserving operations for rectal carcinoma on function of the anal sphincter in man. *Br J Surg* 67:203–208
20. Otto IC, Ito K, Ye C, Hibi K, Kasai Y, Akiyama S et al (1996) Causes of rectal incontinence after sphincter-preserving operations for rectal cancer. *Dis Colon Rectum* 39:1423–1427
21. Williamson ME, Lewis WG, Finan PJ, Miller AS, Holdsworth PJ, Johnston D (1995) Recovery of physiologic and clinical function after low anterior resection of the rectum for carcinoma: myth or reality? *Dis Colon Rectum* 38:411–418
22. Cohen AM, Enker WE, Minsky BD (1990) Proctectomy and coloanal reconstruction for rectal cancer. *Dis Colon Rectum* 33:40–43
23. Williams NS, Dixon MF, Johnston D (1983) Reappraisal of the 5-centimeter rule of distal excision for carcinoma of the rectum: a study of distal intramural spread and of patient's survival. *Br J Surg* 70:150–154
24. Hautefeuille P, Valleur P, Perniceni T, Martin B, Galian A, Cherqui D et al (1988) Functional and oncologic results after coloanal anastomosis for low rectal carcinoma. *Ann Surg* 207:61–64
25. Parc R, Berger A, Tiret E, Frileux P, Nordlinger B, Hannoun L (1987) Anastomosis colo-anal avec reservoir dans le traitement du cancer du rectum. *Ann Gastroenterol Hepatol Paris* 23:329–331
26. Cavaliere F, Fazio VW, Saad RC, Lavery IC, Fiannarelli D (1991) Colo-anal anastomosis (CAA) for lower rectal cancer: a 13-year experience at the Cleveland Clinic. *J Surg Oncol Suppl* 2:172
27. Huguet C, Harb J, Bona S (1990) Coloanal anastomosis after resection of low rectal cancer in the elderly. *World J Surg* 14:619–623
28. Nakagoe T, Ishikawa H, Sawai T, Tsuji T, Tanaka K, Hidaka S et al (2004) Survival and recurrence after a sphincter-saving resection and abdominoperineal resection for adenocarcinoma of the rectum at or below the peritoneal reflection: a multivariate analysis. *Surg Today* 34:32–39
29. Bozzetti F, Mariani L, Miceli R, Doci R, Montalto F, Andreola S et al (1996) Cancer of the low and middle rectum: local and distant recurrences, and survival in 350 radically resected patients. *J Surg Oncol* 62:207–213
30. Berger A, Tiret E, Parc R (1992) Excision of the rectum with colonic J pouch-anal anastomosis for adenocarcinoma of the low and mid rectum. *World J Surg* 16:470–477
31. Melville DM, Ritchie JK, Nicholls RJ, Hawley PR (1994) Surgery for ulcerative colitis in the era of the pouch: St. Mark's hospital experience. *Gut* 35:1076–1080

32. Kirwan WO, Turnbull RB, Fazio VW, Weakly FL (1978) Pullthrough operation with delayed anastomosis for rectal cancer. *Br J Surg* 65:695–698
33. Cavaliere F, Pemberton JH, Cosimelli M, Fazio VW, Beart RW Jr (1995) Coloanal anastomosis for rectal cancer: long-term results at the Mayo and Cleveland Clinics. *Dis Colon Rectum* 38:807–812
34. Cutait DE, Cutait R, Ioshimoto M (1985) Abdominoperineal endoanal pull-through resection. *Dis Colon Rectum* 28:294–299
35. Luna-Pérez P, Rodriguez-Ramirez S, Hernandez-Pacheco F, Gutierrez De La Barrera M, Fernandez R, Labastida S (2003) Anal sphincter preservation in locally advanced low rectal adenocarcinoma after preoperative chemoradiation therapy and coloanal anastomosis. *J Surg Oncol* 82:3–9
36. Bernard D, Morgan S, Tasse D, Wassef R (1989) Preliminary result of coloanal anastomosis. *Dis Colon Rectum* 32:580–584
37. Marcello PW, Roberts PL, Schoetz DJ (1993) Long-term results of the ileoanal pouch procedure. *Arch Surg* 128:500–504